

JUL 01 2009

**Amendment to the claims**

Please amend the claims as shown below in the listing of the claims. The listing of the claims below replaces all previous listings.

Claims 1 to 31 (Cancelled)

32. (Cancelled)

33. (Cancelled)

34. (Cancelled)

35. (Cancelled)

36. (Cancelled)

37. (Cancelled)

38. (Cancelled)

39. (Cancelled)

40. (Cancelled)

41. (Cancelled)

42. (Cancelled)

43. (Cancelled)

44. (Cancelled)

45. (Cancelled)

46. (Cancelled)

47. (Cancelled)

48. (Cancelled)

49. (Cancelled)

50. (Cancelled)

51. (Currently amended) A method of screen-printing a combined O<sub>2</sub>/CO<sub>2</sub> sensor as ~~claimed in claim 39~~ onto a substrate, the combined sensor comprising a pH indicator and a long-lived reference luminophore co-immobilised in a porous sol-gel matrix, the method comprising:

(a) forcing the sensor sol through a mask or mesh onto a substrate; and

(b) drying the substrate so as to form the combined sensor on the substrate.

52. (Currently amended) A method of ink-jet printing a combined O<sub>2</sub>/CO<sub>2</sub> sensor as ~~claimed in any of claims 32, 38 or 39~~ onto a substrate, the combined sensor comprising a pH indicator and a long-lived reference luminophore co-immobilised in a porous sol-gel matrix, the method comprising:

(a) filling an ink reservoir of an ink-jet printer with sensor sol; and

(b) printing the sensor sol onto the substrate using an ink-jet printer so as to form the combined sensor on the substrate.

53. (Currently amended) A method of forming a gas-sensitive sensor on a substrate comprising printing the substrate with a porous sol-gel matrix comprising a gas sensitive indicator so as to form the gas-sensitive sensor on the substrate.

54. (Currently amended) [[A]] The method as claimed in claim 53, wherein the gas sensitive indicator is an oxygen-sensitive luminescent complex.

55. (Currently amended) [[A]] The method as claimed in claim 53, wherein the gas sensitive indicator is a pH indicator and a long-lived reference luminophore.

56. (Currently amended) [[A]] The method as claimed in claim 53, wherein the gas sensitive indicator is a pH indicator and the substrate is further provided with separate oxygen impermeable layer comprising a long-lived reference luminophore.

57. (Currently amended) [[A]] The method as claimed in claim 53, wherein two gas sensors are formed on the substrate.

58. (Currently amended) [[A]] The method as claimed in claim 53, wherein the sensor is formed on the substrate by a method selected from the group consisting of dip-coating, spin-coating, spray-coating, stamp-printing, screen-printing, ink-jet printing, pin printing, lithographic or flexographic printing or gravure printing.

59. (Currently amended) [[A]] The method as claimed in claim 53, wherein the substrate is selected from the group consisting of plastics materials including surface-enhanced PET, PE and PET/PE laminates[[,]]; adhesive plastic labels[[,]]; rigid substrate materials including glass, Perspex/PMMA, polymer materials, and from which DVDs are made for example polycarbonate and other polymer materials; metal[[,]]; and flexible substrate materials including acetate or flexible polymer materials, paper, optical fibre or glass/plastic capillary tubes.

60. (Currently amended) [[A]] The method as claimed in claim 53, wherein the sensor is a luminophore-based sensor.

61. (Currently amended) [[A]] The method as claimed in claim 53, wherein the sensor is a colorimetric-based sensor.

62. (Currently amended) A substrate having a gas-sensitive sensor formed thereon, the substrate prepared by the method of claim 52. ~~wherein the sensor comprises a sol-gel matrix comprising a gas sensitive indicator and the sensor has been formed by printing.~~

63. (Currently amended) [[A]] The substrate as claimed in claim 62, wherein the substrate is selected from the group consisting of plastics materials including surface-enhanced PET, PE and PET/PE laminates[[,]]; adhesive plastic labels[[,]]; rigid substrate

materials including glass, Perspex/PMMA, polymer materials, ~~and from which DVDs are made for example polycarbonate and other polymer materials;~~ metal[[,]]; and flexible substrate materials including acetate or flexible polymer materials, paper, optical fibre or glass/plastic cap.

64. (New) A method of ink-jet printing a combined O<sub>2</sub>/CO<sub>2</sub> sensor onto a substrate, the method comprising:

- (a) filling an ink reservoir of an ink-jet printer with sensor sol; and
- (b) printing the sensor sol onto the substrate using an ink-jet printer,

wherein the CO<sub>2</sub> sensor comprises a pH indicator and a long-lived reference luminophore, the reference luminophore either (i) being doped in sol-gel particles and co-immobilised with the pH indicator in a porous sol-gel matrix, or (ii) being immobilised in a separate oxygen impermeable layer and the pH indicator in a sol-gel matrix being laid over the impermeable layer,.

65. (New) A method of ink-jet printing a combined O<sub>2</sub>/CO<sub>2</sub> sensor onto a substrate, the method comprising:

- (a) filling an ink reservoir of an ink-jet printer with sensor sol; and
- (b) printing the sensor sol onto the substrate using an ink-jet printer,

wherein the combined O<sub>2</sub>/CO<sub>2</sub> sensor comprises:

(1) an O<sub>2</sub> sensor comprising an oxygen sensitive luminescent complex immobilised in a porous sol-gel matrix, and

(2) a CO<sub>2</sub> sensor comprising a pH indicator and a long-lived reference luminophore, the reference luminophore either (i) being doped in sol-gel particles and co-immobilised with the pH indicator in a porous sol-gel matrix, or (ii) being immobilised in a separate oxygen impermeable layer and the pH indicator in a sol-gel matrix being laid over the impermeable

layer, the sensor being interrogatable by an optical reader wherein the phase difference of a reference and an excitation phase signal is measured.